

CALIFORNIA WILDFIRES LESSONS LEARNED FOR RADIO COMMUNICATIONS

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**SPECIFIC LESSONS FOR
AMATEUR RADIO
EMERGENCY
COMMUNICATIONS BASED
ON THE ANNUAL
CALIFORNIA URBAN /
WILDLAND FIRE
EXPERIENCE**



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K6ARN



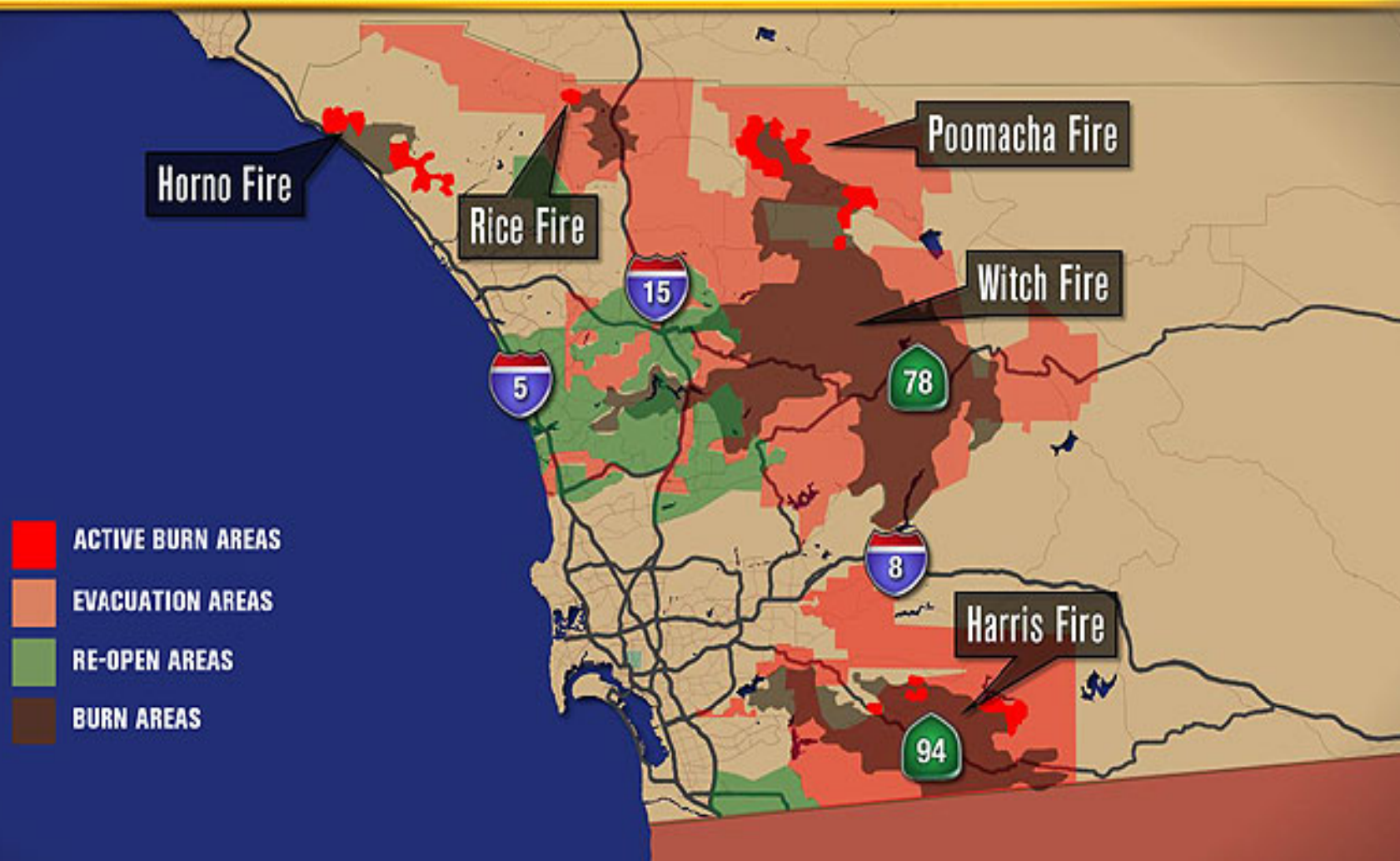
OCTOBER 2007 WILDFIRES

LOTS AND LOTS

SANTIAGO FIREFIGHTING ASSETS (at the peak of the fire):

- **1,982 Fire Personnel**
- **212 Engines/Trucks**
- **1 Lead Plane**
- **9 Helicopters**
- **1 Air Attack Plane (with relief)**
- **4 Fixed-wing Air Tankers**
- **25 Hand crews**
- **17 Dozers**
- **13 Water Tenders**

SAN DIEGO WILDFIRES





PRINCIPLE

In disasters, what are thought to be "communications problems" are often coordination problems in disguise.

Erik Auf der Heide, MD, MPH, FACEP
Atlanta
2000

COMMUNICATIONS NETS

- 
- A photograph of a large, modern control room or operations center. The room is filled with rows of computer workstations, each with multiple monitors. Several people are visible at the workstations, likely operators or analysts. The room has a high ceiling and large windows in the background, letting in natural light. The overall atmosphere is professional and high-tech.
- **COMMAND**
 - **TACTICAL**
 - **LOGISTICS**
 - **AIR**
 - **AIR TO AIR**
 - **AIR TO GROUND**

BASE CAMP LOGISTICS

COMMAND

AIR TO AIR

ROADS TAC

LAW EVAC TAC C

FIRE
TAC B

AIR TO GROUND

FIRE

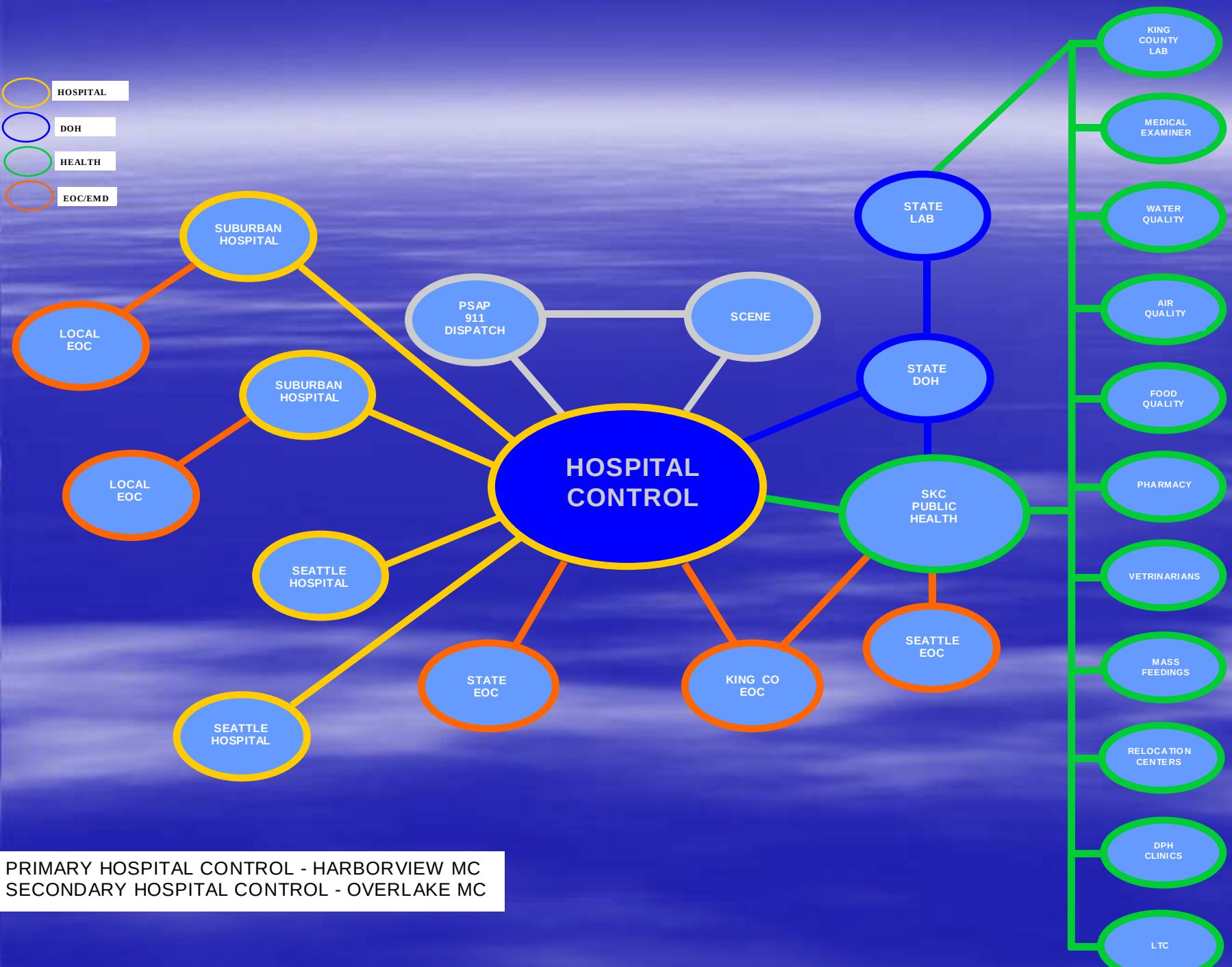
FIRE
TAC A

STRUCTURE GROUP TAC

COMMUNICATIONS NETS

- 
- **WHO DO YOU WANT TO TALK TO AND WHY?**
 - **EOC - ROADS - LAW**
 - **HOSPITAL – CLINICS - SUPPLIERS**
 - **POWER - WATER COMPANY**
 - **WASTE COMPANY**
 - **BUS COMPANY**
 - **SCHOOLS**

MAT NDMS DRILL



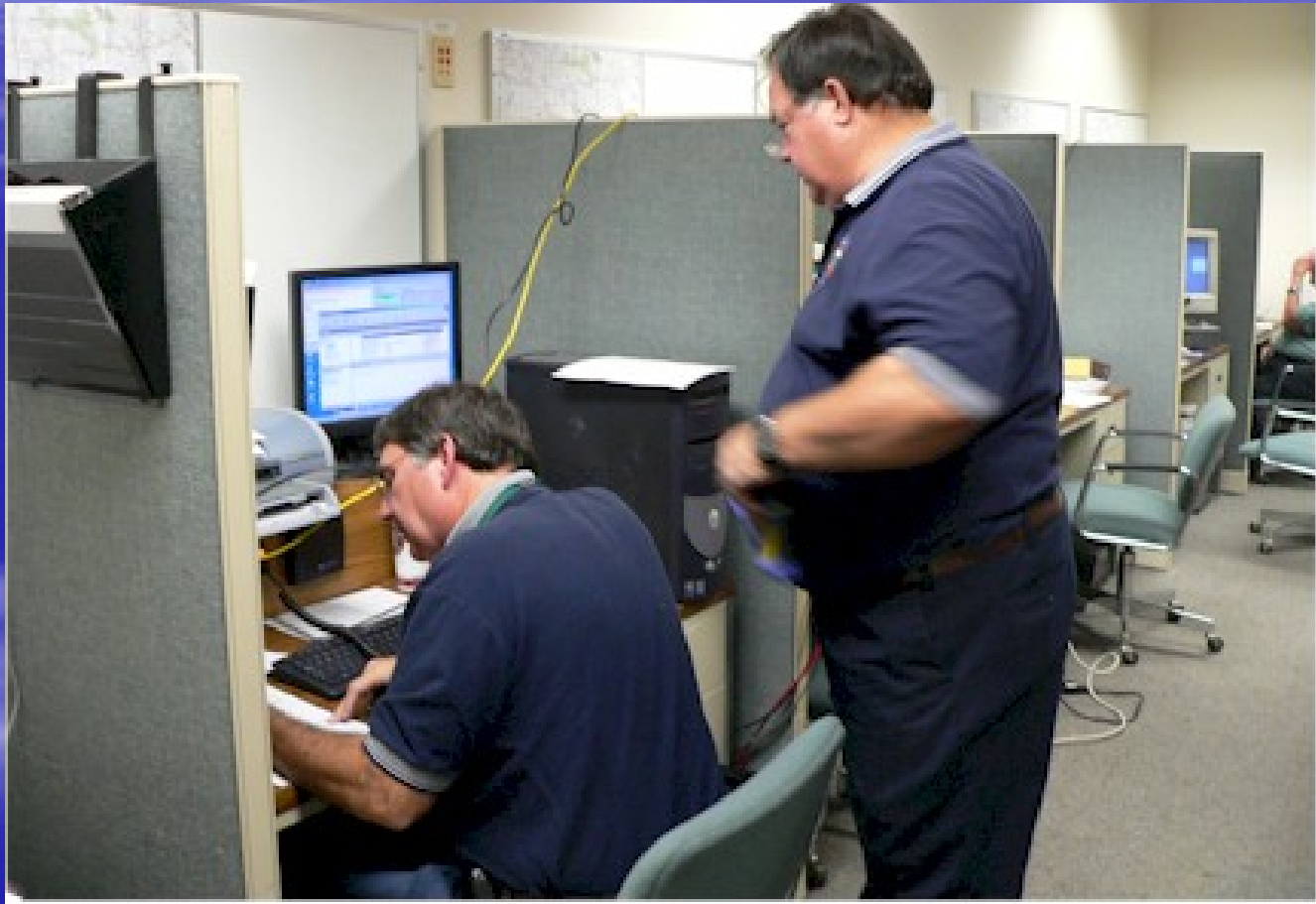
PRIMARY HOSPITAL CONTROL - HARBORVIEW MC
SECONDARY HOSPITAL CONTROL - OVERLAKE MC

**WHAT ROLE DOES
AMATUER RADIO FILL IN
COMPLETING
COMMUNICATIONS LINK?**

**WHO IS OUR CUSTOMER?
WHAT ARE THE
EXPECTATIONS?**



MOU ?



FIRESCOPE PLANNING

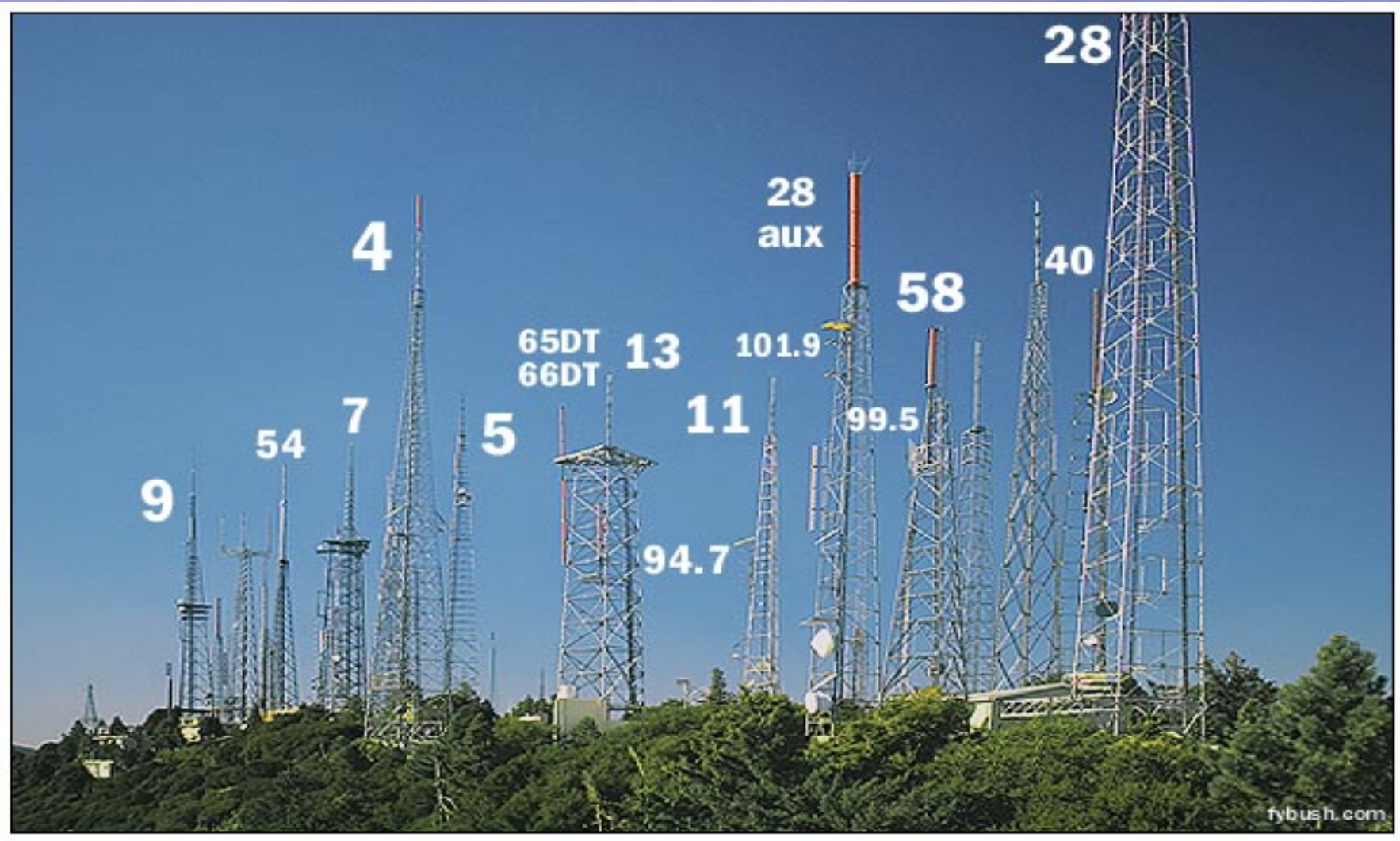
■ **COMMON FREQUENCY BANDS**

- **60 METERS**
- **6 METERS**
- **2 METERS**
- **220 MHZ**
- **440 MHZ**
- **1,200 MHZ**
- **DSTAR**
- **P25**
- **PACKET**

FIRESCOPE PLANNING

- **COMMON FREQUENCY BANDS**
- **COMMON RADIO CHANNELS**
 - WHAT BAND PLAN?
 - RELIABILITY / COVERAGE / TALK-IN
 - OVERUSE OF SINGLE RESOURCES
 - WHO USES WHAT? AND WHEN?
 - DIGITAL?
 - REDUNDANCY

REPEATER MOU



REPEATER MOU'S?



Scott Fybush/fybush.com

Cougar, and Seattle beyond it, from West Tiger

FIRESCOPE PLANNING

- **COMMON FREQUENCY BANDS**
- **COMMON RADIO CHANNELS**
- **COMMON CHANNEL NAMES**

January 17, 2008 MACS 441-1 7

COMMUNICATIONS RESOURCE AVAILABILITY WORKSHEET

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Frequency Band

VHF HIGHBAND Description

FIREScope STATEWIDE CHANNEL PLAN – 2008

Channel Configuration		Channel Name/Trunked Radio System			Eligible Users	RX Freq N or W	RX Tone/NAC	TX Freq N or W	Tx
Tone/NAC	Mode	Remarks							
Simplex – Mo only	CDF T3	Fire	151.1750 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T4	Fire	151.1900 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T5	Fire	151.2500 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T6	Fire	151.3250 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T7	Fire	151.3400 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T8	Fire	151.3700 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T9	Fire	151.3850 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T10	Fire	151.4000 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T11	Fire	151.4450 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T12	Fire	151.4600 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T13	Fire	151.4750 N	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T14	Fire	159.2250 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T15	Fire	159.2700 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T16	Fire	159.2850 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T17	Fire	159.3150 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T18	Fire	159.3450 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T19	Fire	159.3600 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T20	Fire	159.3750 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T21	Fire	159.3900 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T22	Fire	159.4050 W	None	Simplex	None	A	Usage Note 5, 7	
Simplex – Mo only	CDF T23	Fire	159.4500 W	None	Simplex	None	A	Usage Note 5, 7	
Repeater Pair	NIFC C1	Fire	168.7000 N	None	170.9750 N	None	A	Usage Note 3, 5, 6	
Repeater Pair	NIFC C2	Fire	168.1000 N	None	170.4500 N	None	A	Usage Note 3, 5, 6	
Repeater Pair	NIFC C3	Fire	168.0750 N	None	170.4250 N	None	A	Usage Note 3, 5, 6	
Repeater Pair	NIFC C4	Fire	166.6125 N	None	168.4000 N	None	A	Usage Note 3, 5, 6	

Documented Standards

- Simplex – Mo only **CDF T23** Fire
159.4500 W None Simplex None
A Usage Note 5, 7
- Repeater Pair **NIFC C1** Fire 168.7000
N None 170.9750 N None A
Usage Note 3, 5, 6

FIRESCOPE PLANNING

- **COMMON FREQUENCY BANDS**
- **COMMON RADIO CHANNELS**
- **COMMON CHANNEL NAMES**
- **COMMON PROGRAMMING**

**STANDARDIZED PROGRAMMING
FOR INSTALLED AND MEMBERS
RADIOS – ALL BANDS – ALL
RADIOS – ENTIRE VICINITY**

FIRESCOPE PLANNING

- **COMMON FREQUENCY BANDS**
- **COMMON RADIO CHANNELS**
- **COMMON CHANNEL NAMES**
- **COMMON PROGRAMMING**
- **COMMON CTCSS TONE PROGRAM**

STATE OF CALIFORNIA AGENCIES (E.G., CDF & OES) AND FEDERAL AGENCIES USE THE FOLLOWING TWELVE STANDARD TONES FOR REPEATER ACCESS AND MUST BE INCLUDED FOR REPEATER USE. RECEIVERS MUST BE PROGRAMMED FOR CARRIER SQUELCH (NO TONES).

- | | | |
|------------------|------------------|------------------|
| 1. 110.9 | 2. 123.0 | 3. 131.8 |
| 4. 136.5 | 5. 146.2 | 6. 156.7 |
| 7. 167.9 | 8. 103.5 | 9. 100.0 |
| 10. 107.2 | 11. 114.8 | 12. 127.3 |

FIRESCOPE PLANNING

- **COMMON FREQUENCY BANDS**
- **COMMON RADIO CHANNELS**
- **COMMON CHANNEL NAMES**
- **COMMON PROGRAMMING**
- **COMMON CTCSS TONE PROGRAM**
- **COMMON RADIOS – MULTIPLE**



COMMON RADIOS?



FIRESCOPE PLANNING

- **COMMON FREQUENCY BANDS**
- **COMMON RADIO CHANNELS**
- **COMMON CHANNEL NAMES**
- **COMMON PROGRAMMING**
- **COMMON CTCSS TONE PROGRAM**
- **COMMON RADIOS**
- **TRAINING**

FIRESCOPE PLANNING

- **TRAINING**

- RADIO OPERATOR**

- DISPATCHER**

- COM TECH**

- COM UNIT LEADER**

WHO KNOWS WHO IS
WHERE?

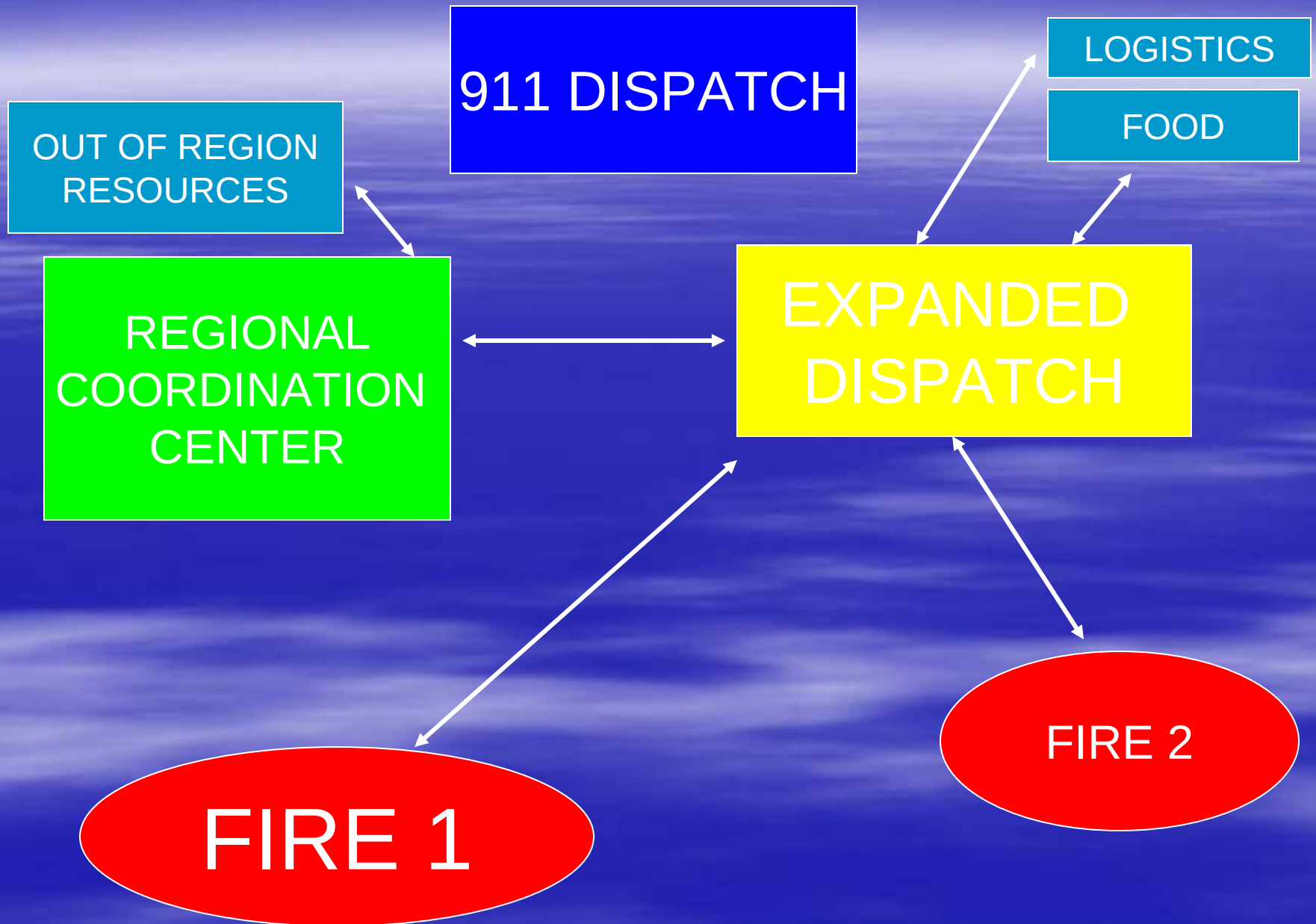


WHO CARES?

**WHO? WHAT AGENCY?
MANAGES RESOURCES?
WHO IS ALLOWED, INVITED, TO
COME AND PLAY?**

**WHO IS NOT INVITED? WHY?
HOW ARE VOLUNTEERS FIRED?**





- STAFFING PATTERNS
- RELIEF CREWS
- RELIEF SUPPLIES
- RELIEF TECHNOLOGY

FUEL FOR REPEATERS

BATTERIES

SPARE REPEATERS

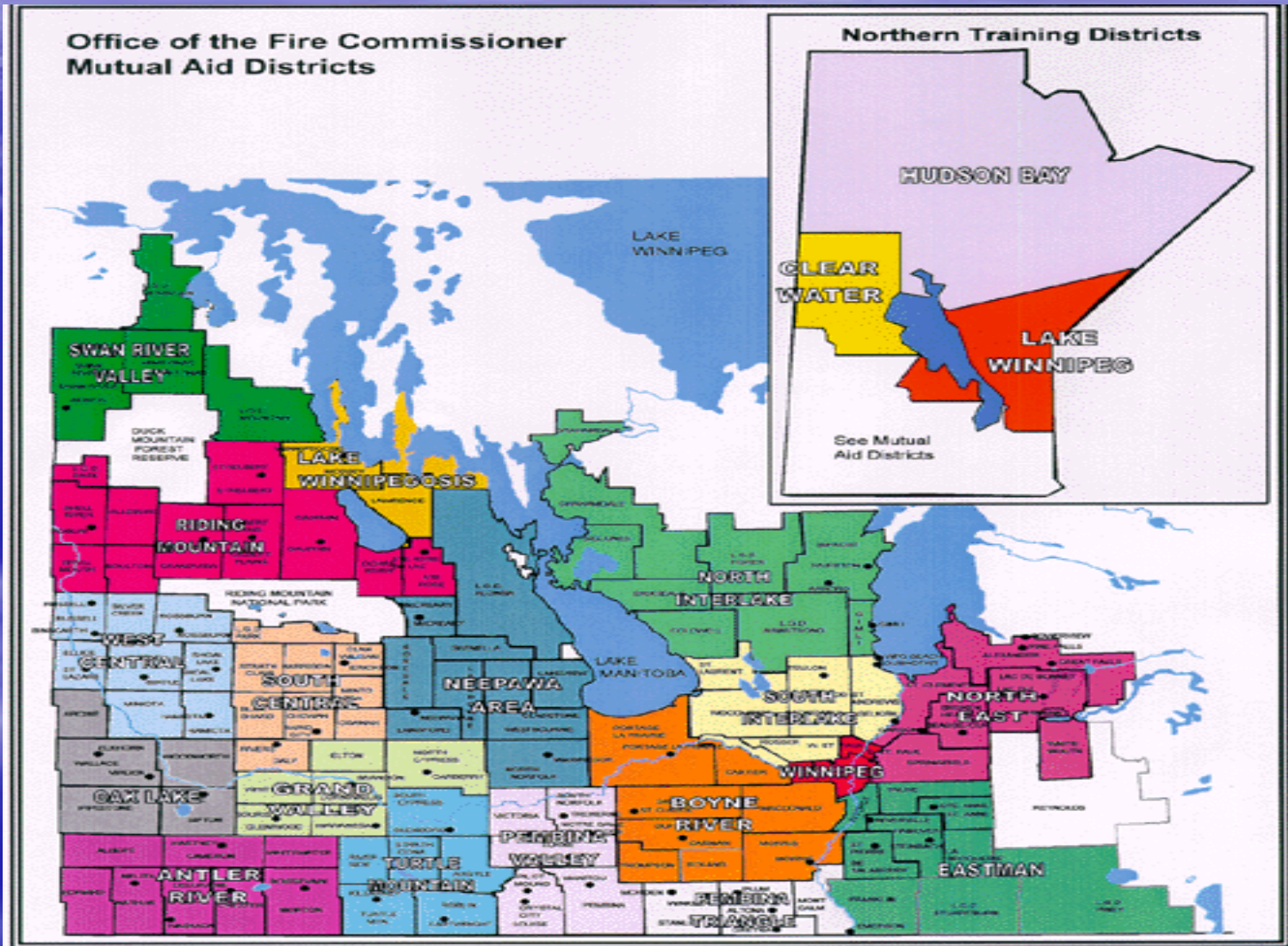
HF SYSTEMS

TELEPHONES

INTERNET



MUTUAL AID AGREEMENTS



PRINCIPLE

Disasters create the need for coordination among fire departments, law enforcement agencies, hospitals, ambulances, military units, utility crews, and other organizations. This requires inter-agency communication networks utilizing compatible radio frequencies.

CHP Emergency Response



RC Sheriff – Note MDT and VHF Radio



RIVERSIDE FIRE



CHP HIGHWAY PATROL





The background image is a dramatic landscape. It features a dark, rugged terrain in the foreground, possibly a mountain or a forest. The sky is filled with large, billowing clouds. A bright light source, likely the sun, is positioned behind the clouds on the left side, creating a strong backlighting effect and illuminating the edges of the clouds. The overall color palette is dominated by dark blues, greys, and browns, with a bright white/yellow light source.

PRINCIPLE

**Those who work together
well on a daily basis tend to
work together well in
disasters.**

WORK TOGETHER

- MEETINGS
- RELATIONSHIPS
- WRITTEN PLANS
- TRAINING DRILLS
- GLOBAL PICTURE
- “LEAN FORWARD”

**FIRECOM HAS BEEN IN EXISTANCE
FOR 30 YEARS FOSTERING
COOPERATION, STANDARDS,
DOCUMENTATION AND TRAINING
AMONG SO CAL FIRE AGENCIES.
WILL AMATEUR RADIO LEARN AND
FOLLOW THIS EXAMPLE?**

**WHO IS IN CHARGE AND WHAT IS THE
MISSION? COHESIVE GROUPS OF
RESPONDERS USE TO WORKING WITH
EACH OTHER WITH THE SAME
INFORMATION**



REFERENCES

- Fire Scope
 - <http://www.firescope.org/>
- Fire Scope Communications
 - <http://www.firescope.org/ics-big-fog/ICS420-1AppendixA.pdf>
- Disaster Response – Interagency Communications
 - <http://orgmail2.coe-dmha.org/dr/DisasterResponse.nsf/section/05?opendocument>

REFERENCES

- National Interagency Incident Communications
 - <http://www.fs.fed.us/fire/niicd/index.html>
- Wildland Fire Communications
 - <http://www.fireradios.net/>
- Radio System Reference Diagrams
 - http://www.fs.fed.us/fire/niicd/docs/system_diagrams_v4.pdf